Tsuguo HONGO*:

Studies on the Agaricales of Japan 1.

The genus *Hygrophorus* in Shiga-Prefecture (1)

本郷次雄*:

日本産マツタケ目菌類の研究 1

滋賀県産アカヤマタケ属 (1)

The present paper is intended to report the species of *Hygrophorus* collected in Shiga-Prefecture, especially in the vicinity of Ōtsu-city, during the writer's course of the Agaricales of Japan.

In this paper 25 species and 3 forms are recorded for the prefecture. All the collections have been deposited in the writer's herbarium.

Subgenus Limacium

Only 2 species of this subgenus have been collected, but it is very probable that more species will be added in future.

1) **Hygrophorus capreolarius** (Kalchbr.) Sacc., Fl. Ital. Crypt., Hymen. 342 (1915) (non Imai).

H. purpureobadius Imai in Bot. Mag. Tokyo, **55**: 447 (1941) — Hongo in Mem. Facul. Lib. Arts & Educ. Shiga Univ. pt. 2, **2**: 48 (1953).

Spores ellipsoid, smooth, 6–8×3.5–5 μ; basidia 4-spored, 35–38×6.5μ; gill-trama of divergent hyphae.

Hab.: Gregarious or scattered on the ground under conifers (e.g. *Abies firma*), Ishiyama-dera, Ōtsu-city, Oct. 13, 1951; Oct. 23, 1952; Oct. 29, 1953 — Hiyoshi-Shrine, Ōtsu-city, Oct. 29, 1956.

Distr. Japan (Tokyo, Shiga), Europe, North America.

The small size and dark red brown color distinguish it from the relatives.

2) **H. hypothejus** (Fr.) Fr. forma **pinetorum** (Hongo) Hongo, comb. nov.

H. pinetorum Hongo in Acta Phytotax. Geobot. **15**: 103 (1954).

A typo corpori minori, pileo 1–3 cm lato et stipite 3–4 cm longo 2–4 mm crasso distinguitur.

Spores ellipsoid, smooth, 7.5–9.5×4–5.5μ; basidia 4-spored, 36–47×7.5–9μ; cheilo- and pleurocystidia not differentiated; hymenophoral-trama bilateral.

Hab.: Scattered or gregarious on the ground in woods of *Pinus densiflora*, Seta-cho, Dec. 3, 1950; Jan. 5, 1952; Jan. 6, 1955—Zeze-Ikenouchi-chō, Ōtsu-city, Dec.

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27, 1952; Jan. 7, 1954—Ishiyama-Hiratsu-chō, Ōtsu-city. Dec. 17, 1954; Dec. 10 and 17, 1957. Distr. Endemic (Shiga).

A pinophilous, winter fungus. The small size of the carpophores distinguishes this form from the main type.

Subgenus Camarophyllus

3) **H. lacmus** Fr., Epicr. 329 (1838)—Hongo in Mem. Facul. Lib. Arts & Educ. Shiga Univ. pt. 2, **7**: 41 (1957).

Spores subspheric oval to broadly elliptic, smooth, 7–9×6–6.5μ or 6.5–7.5×5.5–6μ; basidia 4-spored, 38–50×6.5–8.5μ; cheilo- and pleurocystidia none.

Hab.: Gregarious on mossy ground in coniferous woods (*Pinus, Chamaecyparis*, etc.), Ishiyama-Hiratsu-chō, Ōtsu-city, Nov. 7, 1955; Nov. 8, 1956. Distr. Japan (Shiga), Europe.

Edible. Not common. The lilac-brownish-gray cap, the cinereous gills, and the tendency of the base of the stem to become yellowish distinguish this species.

4) **H. virgineus** (Fr.) Fr., Epicr. 327 (1838).

Spores ovate, smooth, 1-guttulate, 7.5–10×5.5–6.5μ; basidia 2- or 4-spored, 35–45×6.5–7μ.

Hab.: Solitary or gregarious among herbs, Hiyoshi-Shrine, Ōtsu-city, Nov. 10, 1955.

Distr. Japan, Europe, North and South America, Africa, Australia.

Rather uncommon. Edible.

5) **H. pratensis** (Fr.) Fr., Epicr. 326 (1838).

Spores broadly ellipsoid, smooth, 6.5–7.5×4–5μ; basidia 4-spored, 36–48×4.5–5.5μ; cheilo- and pleurocystidia none.

Hab.: Gregarious among grass or moss, on commons in woods, sometimes in bamboo forests, Chausuyama, Ōtsu-city, May 14, 1952—Kami-beppo-chō, Ōtsu-city, Nov. 17, 1952—Mii-dera, Ōtsu-city, June 13, 1953—Ishiyama-Hiratsu-chō, Ōtsu-city, Dec. 2, 1955. Distr. Japan, Europe, North America.

Very common. Edible.

Subgenus Hygrocybe, Sect. 1. Tristes

6) **H. ovinus** (Fr.) Fr., Epicr, 328 (1838).

Spores ellpsoid to ovoid, smooth, 8–10(11)×5–6(7)μ; basidia 4- or 2-spored, 30–44×6.5–7.5μ.

Hab.: Gregarious on grassy commons and at road-sides with short grasses, Tanakami-Kurozuchō, Ōtsu-city, June 22 and Sept. 30, 1955; June 5, 1956; July 11, 1957—Ishiyama-Senjō, Ōtsu-city, July 16, 1956.

Distr. Japan, Europe, North America.

A very characteristic species. Easily recognized by the soot brown color and rubescent gills.

Sect. 2. Laeti, Subsect. 1. Coccinei

7) **H. miniatus** (Fr.) Fr., Epicr. 330 (1838).

Spores ellipsoid to narrowly ellipsoid, smooth, sometimes constricted at middle, 8-10.5(11)×4.5-5.5μ; basidia 2- or 4-spored, 35-54×6-7μ.

Hab.: Gregarious among grass and *Saŝa*, Ishiyama-Hiratsu-chō, Ōtsu-city, Oct. 29, 1955.

Distr. Japan, India, Europe, North America, Australia.

In the writer's specimen both 2- and 4-spored basidia were found in all pilei examined, and they probably account for the variability in spore size.

8) **H. cantharellus** (Schw.) Fr. forma **sphagnicola** Hongo f. nov.

A typo differt habitatione sphaghicola.

Pileus 8-25 mm or more broad, convex to flattened when young, then plane, sometimes the margin recurved in age, surface dry, minutely squamulose especially around the disc, scarlet to orange vermilion with a narrow yellow line round the margin, margin even, scalloped or wavy Context reddish orange, thin, fragile, taste and odor none.

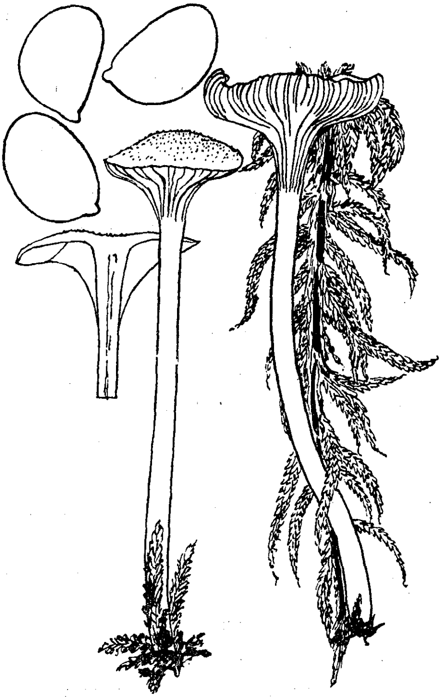

Fig. 1. *Hygrophorus cantharellus* f. *sphagnicola*. (spores ×1500).

Lamellae deeply decurrent, distant ($L=14-17$; $l=1-5$), thickish, often branched, edges even, orange yellow or paler, ±3 mm wide. Stipe 5–8 cm long, 2–3 mm thick, equal, terete, glabrous, concolorous with the pileus above, yellowish below, stuffed to hollow. Spores ovoid to ellipsoid, smooth, nonamyloid, 9–11×6–7μ; basidia 2-spored, 31–40×7–7.5μ; cheilo- and pleurocystidia not differentiated.

Hab.: Scattered among *Sphagnum*, Ishiyama-Hiratsu-chō, Ōtsu-city, June 29 and Oct. 26, 1955; Sept. 26, 1956 (type). Distr. Endemic (Shiga).

This variety is easily recognized by the sphagnicolous habitat and 2-spored basidia. It very much resembles *H. turundus* f. *sphagnophilus* in its color and habitat, but is at once distinguished by its long decurrent orange yellow gills.

9) **H. turundus** (Fr.) Fr., Epicr. 330 (1838)—Hongo in Mem. Facul. Lib. Arts & Educ. Shiga Univ. pt. 2, **6**: 31 (1957).

This species varies very much in color, spore size and habitat. Beside the typical form, the writer has recognized at least three forms from the vicinity of Ōtsu-city.

a) forma **turundus**

Color carmine, scarlet or orange; the squamules on the pileus grayish to fuscous from the first; spores narrowly ellipsoid, smooth, constricted at middle, 9.5–11.5(14.5)×6–7(7.5)μ; basidia 4- or 2-spored, 44–51×8.5–10.5μ; gill-trama pale yellowish, consisting of interwoven, 9–30μ thick hyphae; clamp connections present.

Hab.: Scattered to gregarious amongst moss or grass, on sandy ground at road-borders, meadow-land, etc., Tanakami-Kurozu-chō, Ōtsu-city, July 2 and 12, 1956; Sept. 28, 1956. Distr. Japan (Tokyo, Shiga, Kyoto), Europe, North America.

b) forma **sphagnophilus** (Peck) Smith et Hesler in Sydowia, **8**: 324 (1954).

H. miniatus forma *sphagnophilus* (Peck) Hongo in Journ. Jap. Bot. **27**: 160 (1952).

Color scarlet; the squamules not or only slightly darkening in age; spores 10–14×6–8.5μ; basidia 4- or 2-spored, 38–54×8–9μ.

Hab.: Scattered or gregarious among *Sphagnum* in pine woods, Seta-chō, Sept. 23, 1950; Oct. 7, 1951; Oct. 24, 1954. Distr. Japan (Shiga, Wakayama, Gunma), North America, Europe.

c) forma **macrosporus** (Hongo) Hongo in Mem. Facul. Lib. Arts & Educ. Shiga Univ. pt. 2, **6**: 31 (1957).

H. turundus var. *macrosporus* Hongo in Journ. Jap. Bot. **31**: 144 (1956).

Color orange to yellow; the squamules not fuscescent; spores 10–15×6–7.5μ or 12–16.5×6–7.5μ; basidia 4-spored, 40–48×10–11μ.

Hab.: Gregarious to scattered, in *Sphagnum* bogs under conifers (*Pinus* etc.), Ishiyama-Hiratsu-chō, Ōtsu-city, June 11, 1955—Ishiyama-dera, Ōtsu-city, July 4 and 14, 1955—Ishiyama-Imodani-chō, Ōtsu-city, Aug. 24, 1955. Distr. Endemic (Shiga).

d) forma **minor** Hongo in Journ. Jap. Bot. **32**: 145 (1957); in Mem. Facul. Lib. Arts & Educ. Shiga Univ. pt. 2, **6**: 31 (1957).

H. parvicoccineus S. Ito et Imai sensu Hongo in Mem. Facul. Lib. Arts & Educ. Shiga Univ. pt. 2, **2**: 48 (1953).

Pileus 3–10(14) mm broad, color spectrum red to scarlet; the squamules scarcely fuscescent; stipe 10–25×1–1.5 mm; spores 8–11.5×5–7μ; basidia 4-(rarely 2-) spored, 37–44×7–8μ.

Hab.: Gregarious on sandy ground in grassy plain or in pine woods, Seta-chō, Oct. 19 and 24, 1952—Deyashiki-chō, Kusatsu-city, Sept. 24, 1955—Mii-dera, Ōtsu-city, Sept. 16, 1953—Ishiyama-Terabe-chō, Ōtsu-city, Oct. 24 and 31, 1955; July 25, 1956. Distr. Endemic (Shiga, Hiroshima, Nara).

10) **H. pseudococcineus** Hongo in Journ. Jap. Bot. **30**: 73 (1955).

Spores broadly ellipsoid, smooth, 11–19×7.5–10μ; basidia 4-spored, 46–63×11–14μ; cheilo- and pleurocystidia not differentiated; gill-trama of parallel to subparallel hyphae; pileus-trama homogeneous beneath a turf-like covering of surface hyphae; clamp connections present.

Hab.: Gregarious (or subcespitose) on the ground in mixed woods, Kami-Beppo-chō, Ōtsu-city, June 5, 1954.

This is a beautiful, very distinct species, characterized by the floccose-squamulose cap and very large spores, and it probably lies near to *H. miniatus*, *H. cantharellus*, etc. S. Ito and Imai's *H. macrosporus* appears to be somewhat near, but it is said to have emarginate or free gills and white to yellowish stem.

11) **H. dichrous** Hongo, sp. nov.

Pileo 1–3 cm lato, conico-convexo, dein expanso, demum margine leviter refracto, non viscido, parum translucido, fere glabro vel minute squamuloso, obscure rubro-brunneo, tinctura leviter vinacea, saepe in margine flavido, sicco pallescente: carne subtenui, fragili, subconcolore, in stipite flavida, odore nullo, sapore miti; lamellis adnato-subdecurrentibus, distantibus ($L=14$–19 vel 19–24; $l=1$–3), flavidis, crassis, 2–5 mm latis; stipite 2–7 cm longo, 2–4 mm crasso, aequali vel ad basim subincrassato, interdum compresso, ±fibrilloso-striato, aurantio-flavo, apice pileo subconcolori, cavo.

Microscopic characters: Spores ovate to ellipsoid, smooth, nonamyloid, 7.5–10.5×5–6.5μ; basidia 4-spored, 40–48×7–8μ; cheilo- and pleurocystidia not differentiated.

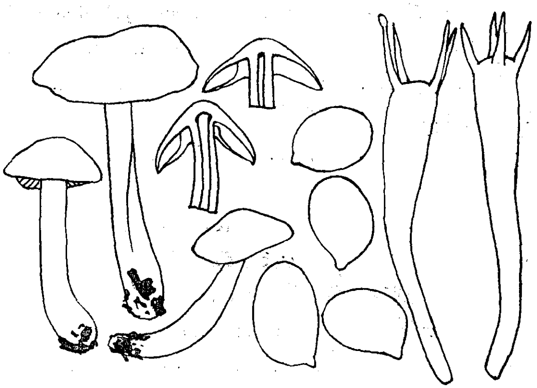

Fig. 2. *Hygrophorus dichrous.* (spores ×1500; basida ×900).

Hab.; Gregarious or scattered on the ground in pine woods (mixed with *Chamaecyparis*), Ishiyama-dera, Ōtsu-city, July 8, 1954 (type); June 23, 1955; July 13, 1957. Distr. Endemic (Shiga).

An uncommon, summer fungus. In color this species bears some similarity to *H. firmus* var. *purpureus* Dennis, but the latter is described as having indian red colored gills and dimorphous basidia.

12) **H. stagninus** Hongo in Journ. Jap. Bot. **32**: 208 (1957).

Spores ovoid, smooth, often somewhat angular, 6.5–8.5×4.5–6μ; basidia usually 4-spored, 32–45×6.5–7μ; cheilo- and pleurocystidia not differentiated; gill-trama of subparallel to somewhat interwoven hyphae, 5–15μ broad; clamp connections present.

Hab.: Scattered in *Sphagnum* bogs, Ishiyama-dera, Ōtsu-city, Nov. 5, 1955, Oct. 16, 1956. Distr. Endemic (Shiga).

This species superficially closely resembles *H. citrinus* Rea sensu Lange, but entirely lacks the viscidity. It also differs in its sphagnicolous habitat and its more or less broader spores. (Lange gave the spore size as 7–10×4–5 or 7–8×4 1/4μ for *H. citrinus.*)

13) **H. aurantius** Murrill in Mycologia, **4**: 332 (1912)—Hongo in Journ. Jap. Bot. **27**: 190 (1952)—Imazeki et Hongo, Col. Ill. Fung. Jap. pl. 2, fig. 13 (1957).

Spores globose or subglobose, smooth, (3.5)4–6(7)×(3.5)4–5μ; basidia 4-spored, 23–37×6.5–7.5μ; gill-trama of subparallel to somewhat interwoven hyphae 5–11μ broad; clamp connections present.

Hab.: Scattered to gregarious on the ground in woods of conifers (*Cryptomeria*, *Chamaecyparis*, etc.), also in bamboo forests or *Sasa*-bushes, Miidera, Ōtsu-city, Dec. 12, 1951; Jan. 16, 1952—Kami-Beppo-chō, Ōtsu-city, Nov. 7, 1953; June 5, 1954—Ishiyama-Hiratsu-chō, Ōtsu-city, May 9, 1955; Oct. 30, 1957.

Distr. Japan (Shiga), North America (Jamaica).

This tiny species is so very well characterized by the aurantiacous color and small, nearly globose spores. Common.

14) **H. coccineus** (Fr.) Fr., Epicr. 330 (1830)—Hongo in Journ. Jap. Bot. **27**: 368 (1952) (ut *coccineus* sensu Ricken).

Spores ellipsoid, smooth, 7.5–10.5×4–5μ; basidia 4-spored, (37)44–60×7.5–9μ; cheilo- and pleurocystidia none; gill-trama of subparallel, (5.5)9–13μ broad hyphae.

Hab.: Gregarious among moss, grass, or *Sasa*, mostly in outskirts of woods (sometimes in bamboo forests), Noda, Takashima-chō, Nov. 9, 1949—near Chausu-yama, Ōtsu-city, Apr. 14, 1952; Apr. 8 and 10, 1953—Hiyoshi-Shrine, Ōtsu-city, May 2, 1956. Distr. Japan, Europe, North America, Australia.

Edible. Rather common, very showy fungus. (to be continued)

摘要

ここに滋賀県産アカヤマタケ属25種3品種を報告することにした。

〔ヌメリガサ亜属〕

1) ヒメサクラシメジ。

2) フユヤマタケ。シモフリヌメリガサ *Hygrophorus hypothejus* (Fr.) Fr. の小形品種。

〔オトメノカサ亜属〕

3) ウバノカサ。

4) オトメノカサ。

5) ハダイロガサ。

〔アカヤマタケ亜属〕 I オオヒメノカサ節

6) オオヒメノカサ。

II アカヤマタケ節 ベニヤマタケ亜節

7) アカヌマベニタケ。

8) ミズゴケベニヒガサ(新品種)。ベニヒガサ *H. cantharellus* (Schw.) Fr. のミズゴケ生のもの。大津市石山平津町で採る。

9) ザラツキキヤマタケ。ミズゴケノハナ・キミズゴケノハナ・ヒメアカヌマベニタケはいずれも本種の品種である。

10) オオアカヌマベニタケ。

11) フタイロヒメノカサ(新種)。傘は粘性なく帯紫暗褐色，ヒダは黄色，茎の頂部は傘と同色，下部は橙黄色。夏季，大津市石山寺のマツ林内に発生する。

12) ヌマキヤマタケ。

13) ヒメダイダイタケ。

14) ベニヤマタケ。 (つづく)